DALSA INC.
CCD Image Sensors

IL-C8
TURBOSENSOR™
Preliminary Information

IL-C8-6032 Linear Image Sensor Array

T·41·55

FEATURES

- **TURBOSENSOR™ Ultra High Speed Technology**
- **6032 Elements**
- **Exposure Control, Pixel Reset and Anti-blooming**
- **20 MHz Effective Data Rate**
- **Linear Response Photoelements**
- **10μm (H) x 10μm (V) Pixel Size**
- **Dual Output Architecture for Improved Throughput**

DESCRIPTION

DALSA's IL-C8-6032 linear CCD image sensor uses TURBOSENSOR™ technology to provide very high data rates of 10 MHz per output for an effective output rate of 20 MHz. The IL-C8 has a pitch of 10μm, which provides the user with high resolution within a small optical aperture. The IL-C8 sensors are ideally suited for high speed, high resolution applications, and employ buried channel CCD shift registers to maximize output speed and reduce noise.

The dynamic range of the photoelements exceeds 10,000:1 and provides an output which is linear for all light levels. Exposure control is incorporated to allow integration times shorter than the readout times. A pixel reset function can be applied to eliminate image lag, and 100X anti-blooming can be achieved.

APPLICATIONS

The IL-C8-6032 image sensor is ideally suited for applications requiring high speed and very high resolution. The IL-C8-6032 provides over 1000 points-per-inch resolution across six inches.

The IL-C8 sensors are ideal for:

- **High Performance Graphics Scanning**
- **Inspection**
- **Document/OCR readers**
- **Gauging and Measurement**

Customer support for DALSA's sensors, boards and cameras is available from DALSA's application engineers.

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IL-C8 PIN FUNCTIONAL DESCRIPTION

SYMBOL	NAME
TCK	Transfer Clock
VSET	Output Node Set Voltage
VOD	Output Drain Bias Voltage
VDD	Amplifier Supply Voltage
OS1	Output Signal 1, Odd Pixels
GND	Ground Reference
CR1	Readout Clock, Phase 1
CR2	Readout Clock, Phase 2
NC	No Connection
OS2	Output Signal 1, Even Pixels
RST	Output Reset Clock
VPR	Pixel Reset Bias
PR	Pixel Reset Clock
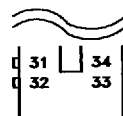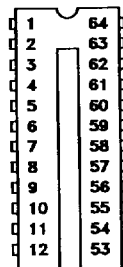
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IL-C8
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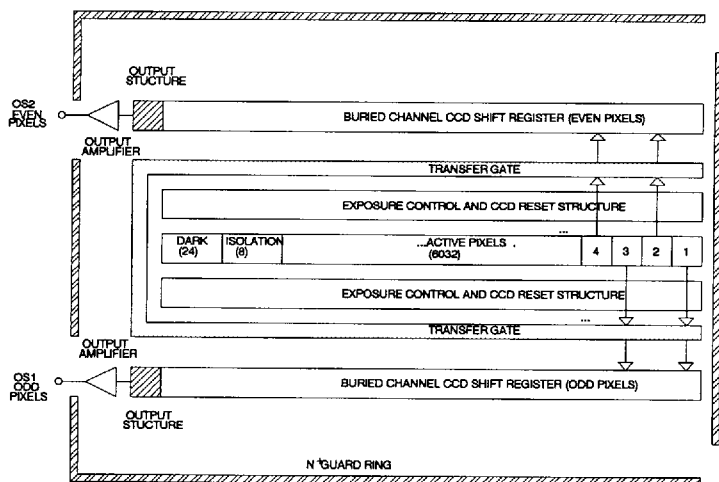*Preliminary Information*

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IL-C8 IMAGE SENSOR BLOCK DIAGRAM

☐ **Package Pin 1 Location**

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FUNCTIONAL DESCRIPTION

PHOTOELEMENTS

The linear array consists of a line of 6032 photoelements, each with a photosensitive area of 100 square micrometers and center to center spacing of 10 micrometers.

The array of photoelements is terminated by 8 isolation pixels and 24 dark reference pixels on the end of the array. The dark reference pixels can be used for clamping purposes.

The TURBOSENSOR™ photoelement offers ultra high speed operation and responds linearly with respect to input light intensity. An electronic shutter exists for exposure control and antiblooming. The electronic shutter may also be used to reset the pixels and eliminate image lag.

TRANSFER GATE

This gate controls the flow of light generated signal charge from the photoelements into the CCD shift registers. Electrons from the photoelement are transferred when a high potential (equal to the high clock voltage) is applied to the transfer gate. A single input to the device (TCK) controls the transfer gate for both the even and odd pixels.

CCD SHIFT REGISTERS

There are two buried channel CCD signal transport shift registers, one on each side of the line of photoelements. Buried channel shift registers are used to maximize speed, improve charge transfer efficiency and reduce noise. Alternate signal charge packets are transferred to the transport CCD shift registers and serially shifted towards the output signal amplifiers.

OUTPUT STRUCTURE

The signal charge packets from the transport shift registers are transferred serially, over the SET gate, to a floating sensing diffusion. As the signal charge is received, the corresponding potential on the diffusion is applied to the input of a two stage low noise amplifier structure, producing an output signal voltage on OS1 or OS2 for the odd and even pixels respectively. The floating sensing diffusion is cleared of signal charge by the reset gate, driven by the reset clock (RST) in preparation for the subsequent signal charge packet.

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Optical and Mechanical Considerations of Sensors

Optical and Mechanical Considerations of DALSA CCD Image Sensors

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This applications note provides packaging information for the sensors listed in this databook. Please refer to the tables on the following pages for the critical dimensions of each image sensor series. For more information on a particular image sensor, please refer to the specific datasheet.

FIGURE 1. DIMENSIONS OF PACKAGE # 50-01-24005

Note: Cavity size will vary depending on length of sensor used.

Window
0.016 +/- 001

0.022 +/- .004

0.085 +/- .004

0.045 +/- .005

1 670 +/- 005

X

ALL DIMENSIONS IN INCHES

0 300 +/- 005

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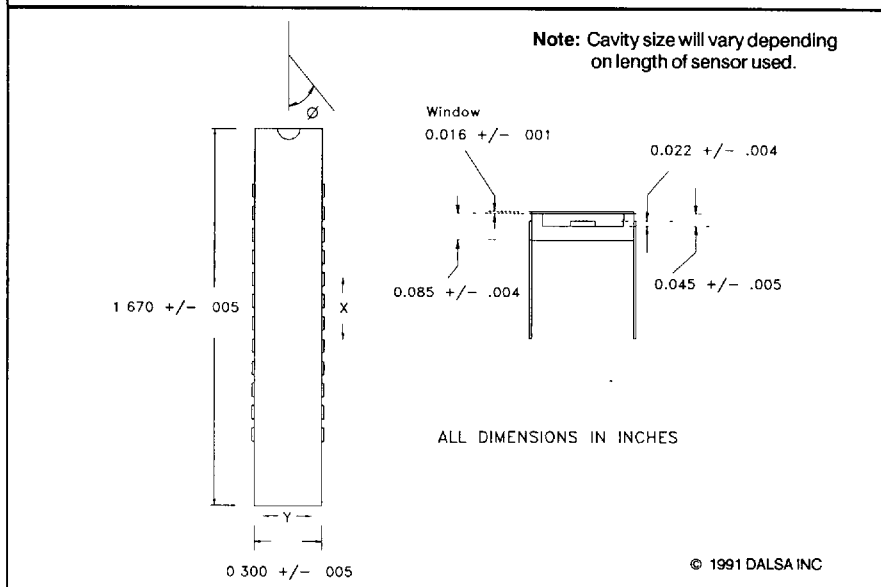
TABLE 1. PACKAGE # 50-01-24005 TYPICAL DIMENSIONS

Package #	Part	X	Y	Ø
50-01-24005	IL-C3-0128	0.55 ± .09	0.15 ± .02	$0^{\circ} \pm 3.0^{\circ}$
50-01-24005	IL-C3-0256	0.55 ± .08	0.15 ± .02	$0^{\circ} \pm 2.5^{\circ}$
50-01-24005	IL-C3-0512	0.55 ± .07	0.15 ± .02	$0^{\circ} \pm 2.0^{\circ}$
50-01-24005	IL-C2-0512	0.55 ± .07	0.15 ± .02	$0^{\circ} \pm 2.0^{\circ}$
50-01-24005	IL-C9-0512	0.55 ± .07	0.15 ± .02	$0^{\circ} \pm 2.0^{\circ}$
50-01-24005	IL-C4-1024	0.55 ± .05	0.15 ± .02	$0^{\circ} \pm 1.5^{\circ}$
50-01-24005	IL-C4-2048	0.55 ± .04	0.15 ± .02	$0^{\circ} \pm 1.0^{\circ}$
50-01-24005	IL-C5-2048	0.55 ± .05	0.15 ± .02	$0^{\circ} \pm 1.5^{\circ}$
50-01-24005	IL-C5-4096	0.55 ± .04	0.15 ± .02	$0^{\circ} \pm 1.0^{\circ}$
50-01-24005	IL-C6-2048	0.55 ± .04	0.15 ± .02	$0^{\circ} \pm 1.0^{\circ}$
50-01-24005	IL-E1-0512	0.55 ± .07	0.15 ± .02	$0^{\circ} \pm 2.0^{\circ}$
50-01-24005	IL-E1-1024	0.55 ± .05	0.15 ± .02	$0^{\circ} \pm 1.5^{\circ}$
50-01-24005	IL-E1-2048	0.55 ± .04	0.15 ± .02	$0^{\circ} \pm 1.0^{\circ}$
50-01-24005	IL-F2-0512	0.55 ± .07	0.15 ± .02	$0^{\circ} \pm 2.0^{\circ}$
50-01-24005	IL-F2-1024	0.55 ± .05	0.15 ± .02	$0^{\circ} \pm 1.5^{\circ}$
50-01-24005	IL-F2-2048	0.55 ± .04	0 15 ± .02	$0^{\circ} \pm 1.0^{\circ}$

Note: X = center imaging area to center pin 1 along package   Y = center imaging area to center pin 1 across package
Ø = off-axis rotation.
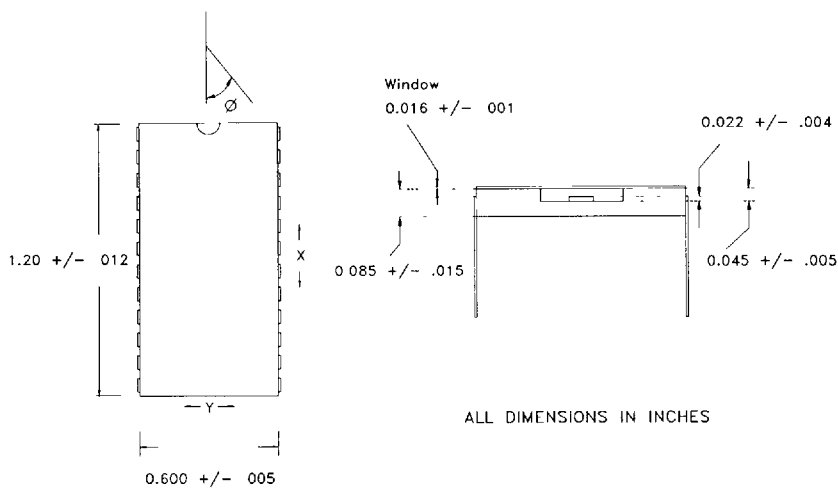

Optical and Mechanical
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FIGURE 2. DIMENSIONS OF PACKAGE # 50-01-40003

Window
0.016 +/- 001

0.022 +/- 004

0.085 +/- .015

0.045 +/- 005

2.00 +/- 020

— Y —

0 600 +/- .005

X

∅

ALL DIMENSIONS IN INCHES

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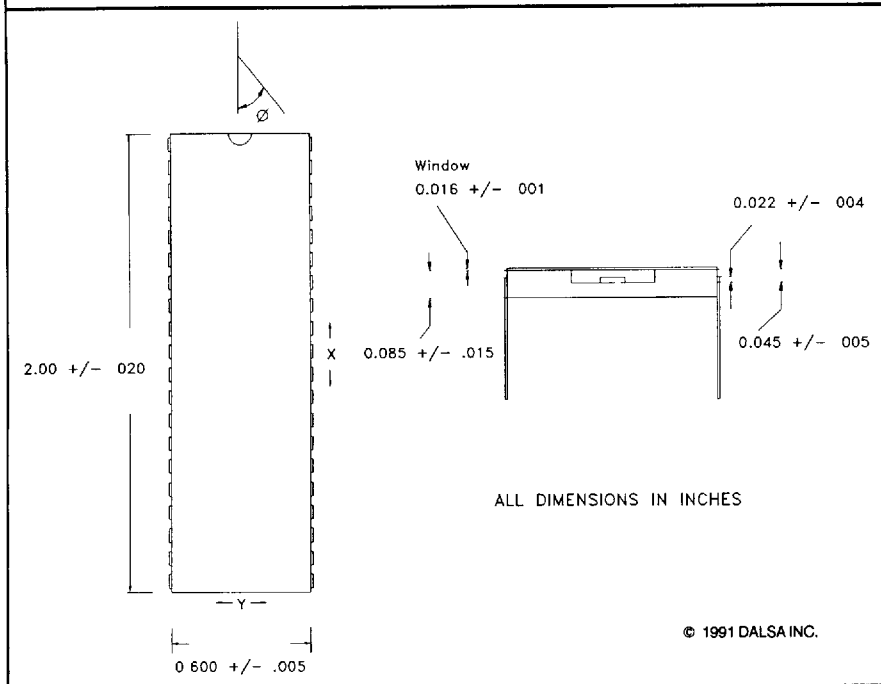
TABLE 2. PACKAGE # 50-01-40003 TYPICAL DIMENSIONS

Package #	Part	X	Y	∅
50-01-40003	IT-C5-2048	0.95 ± 0.1	0.3 ± 0.05	$0^{o} \pm 2.5^{o}$
50-01-40003	IT-C5-4096	0.95 ± 0.08	0.3 ± 0.03	$0^{o} \pm 1.5^{o}$
50-01-40003	IT-E1-1536	0.95 ± 0.08	$0.3 \pm 0 05$	$0^{o} \pm 2.0^{o}$
50-01-40003	IT-E1-2048	0.95 ± 0.06	0.3 ± 0.05	$0^{o} \pm 1.5^{o}$
50-01-40003	IT-F2-2048	0.95 ± 0.06	0.3 ± 0.03	$0^{o} \pm 1.5^{o}$

Note: X = center imaging area to center pin 1 along package. Y = center imaging area to center pin 1 across package
∅ = off-axis rotation.

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FIGURE 3. DIMENSIONS OF PACKAGE # 50-01-24002

Window
0.016 +/− 001

0.022 +/− .004

1.20 +/− 012

X

0 085 +/− .015

0.045 +/− .005

─ Y ─

ALL DIMENSIONS IN INCHES

0.600 +/− 005

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TABLE 3. PACKAGE # 50-01-40002 TYPICAL DIMENSIONS

Package #	Part	X	Y	Ø
50-01-40002	IA-D1-0032	0.56 ± 0.12	0.3 ± 0.05	$0^{\circ} \pm 5.0^{\circ}$
50-01-40002	IA-D1-0064	0.57 ± 0.09	0.3 ± 0.04	$0^{\circ} \pm 4.0^{\circ}$
50-01-40002	IA-D1-0128	0.59 ± 0.12	0.3 ± 0.03	$0^{\circ} \pm 2.5^{\circ}$
50-01-40002	IA-D1-0256	0.71 ± 0.10	0.3 ± 0.03	$0^{\circ} \pm 1.5^{\circ}$

Note: X = center imaging area to center pin 1 along package. Y = center imaging area to center pin 1 across package.
Ø = off-axis rotation

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FIGURE 4. DIMENSIONS OF PACKAGE # 50-01-28004

Window
0.016 +/- .001

0 022 +/- 004

X

1 40 +/- .014

0.100 +/- 010

0.040 +/- .004

ALL DIMENSIONS IN INCHES

— Y —

0.800 +/- .010

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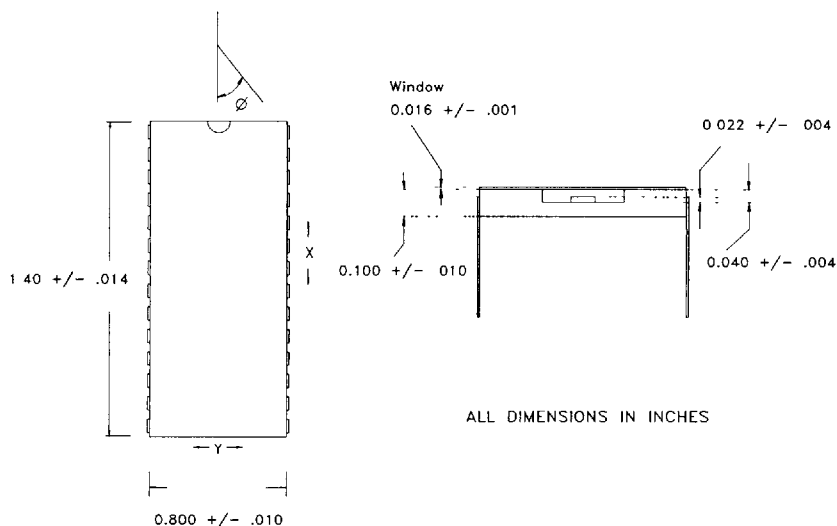
TABLE 4. PACKAGE # 50-01-28004 TYPICAL DIMENSIONS

Package #	Part	X	Y	Ø
50-01-28004	IA-D2-0512	0.65 ± 0.08	0.4 ± 0.04	0° ± 3.0°

Note: X = center imaging area to center pin 1 along package. Y = center imaging area to center pin 1 across package.
Ø = off-axis rotation

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